ADVISORY

Title:

AED for Pediatric Patients

Effective Date:

07/01/2002

SEMAC

Number:

02-02

Replaces/Supercedes:

Purpose

To promote safe and effective use of FDA-approved, pediatric-modified Automatic External Defibrillators (AED) in the pediatric patient under age 8.

Background

Early defibrillation has been shown to reduce morbidity and mortality in patients suffering ventricular fibrillation (VF). The use of AEDs by certified or licensed professionals and the trained lay person has been promoted, in the hope that it will result in more rapid application of this lifesaving therapy in appropriate patients. Thus far the use of AEDs has been limited to patients 8 years of age or older. Concerns about the amount of energy delivered by the previously available equipment, and about the ability of the available equipment to accurately diagnose ventricular fibrillation in pediatric patients has prevented recommendation of AED use in patients less than 8 years. (1).

The Food and Drug Administration (FDA) has recently approved an adaptation to an AED that allows the device to deliver a lower dose of electricity. The dose delivered by this device is 50 joules. This would deliver a dose of 5 joules/kg in the average 10 kg, 1 year old child, and a dose of 2 joules/ kg in the average 25 kg, 8 year old child. Although the maximum safe energy dose for infants and children has not been established, current guidelines for therapeutic defibrillation recommend 2-4 joules/kg. Older animal studies and one recent case report in a child suggest that much higher doses may be well tolerated. (2-4)

The AED, for which the pediatric pad and cable adapter has been designed, has been shown in one published study of 191 children, aged 1 day-12 years, to accurately detect “shockable” rhythms. (5) This study included 74 patients under 1 year of age and documented a specificity for “shockable” rhythms of 100%, in that the AED correctly identified “non-shockable” rhythms 100% of the time, thereby precluding an inappropriate shock. Previous concerns that rapid sinus tachycardia or SVT in an infant or small child might be mistaken for VF or VT by the machine, therefore, were not confirmed by this study. Furthermore, recent data show that up to 19% of pediatric patients with cardiopulmonary arrest, present with ventricular fibrillation, and that pediatric survivors of VF arrest have better neurologic outcomes than those with asystolic arrest. (6-9)

These data, coupled with the apparent safety of this new device, and the decision of the FDA to approve the device with the contingency that the first 50 patients would be carefully monitored by the manufacturer, led the State Emergency Medical Advisory Committee to reconsider the application of AED programs to children under age 8.

In October 2001, the State Emergency Medical Advisory Committee (SEMAC) approved the use of FDA approved pediatric-modified AEDs in children under age 8, by both trained EMS professionals and trained laypersons.

The SEMAC recommendation includes the need for careful monitoring of the use of pediatric-modified AEDs in New York State in accordance with FDA guidelines, as well as the need for additional training in use of the pediatric AED pad and cable system for all potential users of pediatric-modified AEDs both in proper use of AEDs, and in pediatric basic life support (PBLS), including cardiopulmonary resuscitation (CPR).

The SEMAC previously approved, and continues to recommend, use of the standard AED pad and cable system for children 8 years of age and older.

Implementation

The SEMAC recommends that EMS programs and Public Access Defibrillation (PAD) programs that choose to use automated external defibrillators (AEDs) in pediatric patients under 8 years of age, should adhere to the following:

- Use only equipment that has been FDA-approved for pediatric use.
- Use approved AEDs according to the manufacturer's instructions, with due attention to operating procedures, maintenance and expiration dates.
- Have a training program that includes (1) specific orientation to the pediatric capable AED, with particular attention to indications (no signs of circulation, especially with sudden collapse, and for the large majority of pediatric patients, the continued importance of initial respiratory/airway management, and (2) training in infant and pediatric basic CPR

- Have a quality assurance/improvement program that requires the collection of data on all pediatric AED use and a mechanism of sharing that data on a regular basis with the local REMAC and the SEMAC. At a minimum the data should include: age of patient, device used, condition of patient when applied, outcome of patient and any adverse events noted (equipment failure, burns under pads, etc.)

References

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